



HORIZON 2020 - Future & Emerging Technologies (FET)

Work Programme 2018-2020 & FET Flagships

Athens, 26 September 2017

FET Open and FET Proactive

Wide Hogenhout

Flagships Unit

DG Connect, European Commission

Overview of FET Open and Proactive in Workprogramme 2018-20

FET Open (RIA, CSA) : 715 M€, deadlines 2018, 2019, 2020

FET Proactive (RIA, CSA, ERA-NET): 94.5 M€, deadline 2018

FET HPC (RIA, CSA): 72 M€, deadlines 2018, 2019

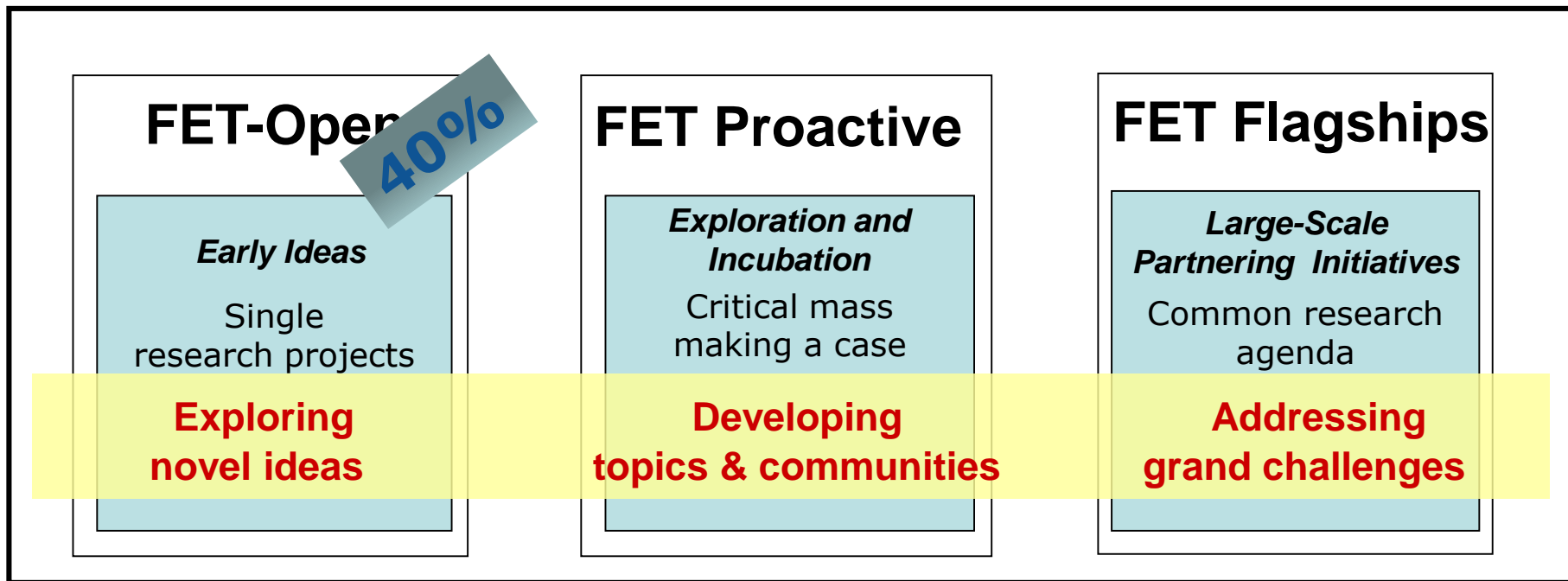
Workprogramme will be updated in 2019 to define topics for 2020 calls

FET mission

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- *To turn Europe's excellent science base into a competitive advantage by uncovering radically new technological possibilities*
- *To turn Europe into the best place for collaborative research and innovation in future and emerging technologies*





Small projects
up to 3M€

Medium size projects
4 to 7M€

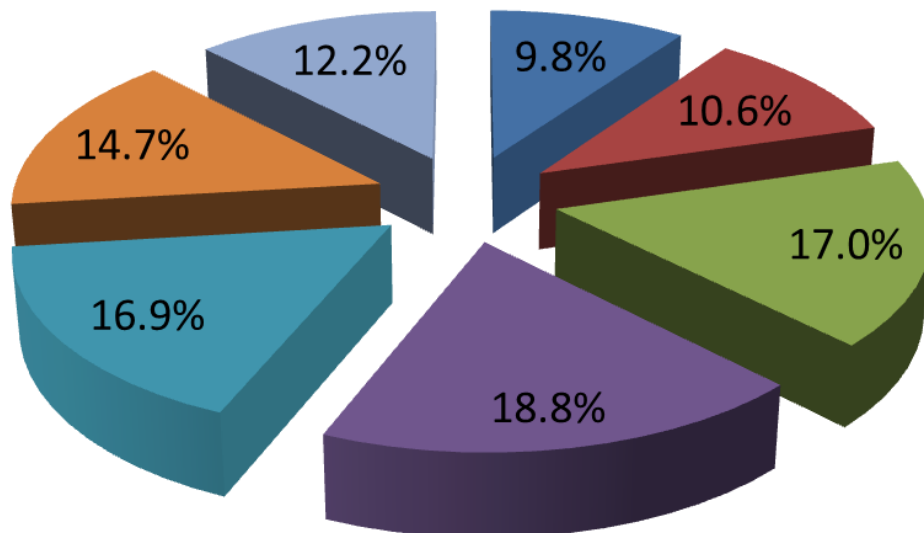
Large initiatives

FET Open:

- *aims to establish European leadership in the early exploration of future technologies.*
- *looks for opportunities of long-term benefit for citizens, the economy and society*
- *aims to mobilise Europe's most creative and forward thinking researchers from all disciplines to work together and explore what may become the leading technology paradigms of the future*

Successfully reaching out to new domains!

Clustering of proposals from the first call



- Energy, Transport, Environment
- Bio-Robotics and HCI
- Life Science, Medicine, Biology, NeuroBio
- Electronics, Telecom, Optics, Hardware, Sensors, Devices
- Computer Science, Bio-informatics, Complexity, Data mining
- Nanoscience, Quantum Physics, Astrophysics
- Materials, Chemistry

First call : 638 eligible proposals - 77M€ budget - success rate : 3,75%
Second call: 664 eligible proposals – 38,5M€ budget – success rate : 1,7%
Ongoing call: 799 eligible proposals – 38,5M€ budget – success rate ~1,1 to 1,5%?

Call - FET Open – Novel ideas for radically new technologies

FETOPEN-01-2018-2019-2020: FET-Open Challenging Current Thinking

Research projects (RIA): 705 M€, deadlines 2018, 2019, 2020

FETOPEN-02-2018: FET-Open Coordination and Support Actions

3 CSA topics: Communication and outreach, Innovation and Observatory

Total budget 2 M€, deadline 11/04/2018

FETOPEN-03-2018-2019-2020: FET Innovation Launchpad

CSA projects to support take-up of FET project results

Total budget 8.2 M€, deadlines 2018, 2019, 2020

FET-Open - Novel ideas for radically new technologies

FET-Open Challenging Current Thinking

- FET gatekeepers reduced from 6 to 3 for clearer scoping
- Evaluation strengthens role of scope and discourages poor resubmissions
- Indicative size 'up to EUR 3 million'
- Single stage, continuously open with regular cut-off dates

FET-Open Coordination and Support Actions

- Focused on impact enhancing measures for Communication, Innovation and Horizon Scanning (Observatory)

FET-Open FET Innovation Launchpad

- Call text simplified, taking into account lessons learned

Total budget for FET Open in Horizon 2020 (incl. CSAs) will be around 1070 M€, i.e., meeting the target of 40% of the total FET budget in Horizon 2020

FET-Open - Measures for reducing oversubscription and increasing success rate.

- *Increasing available budget per cut-off date*
- *Clearer definition of mandatory "FET gatekeepers", including by stating for each what we don't aim to fund.*
- *Possibility to declare proposals out of scope based on gatekeepers*
- *Direct mapping from gatekeepers to evaluation criteria.*
- *Indicative funding per project "up to 3MEuro"*
- *Possibility to give feedback to proposers with respect to an eventual future resubmission*

Fet Open proposals should:

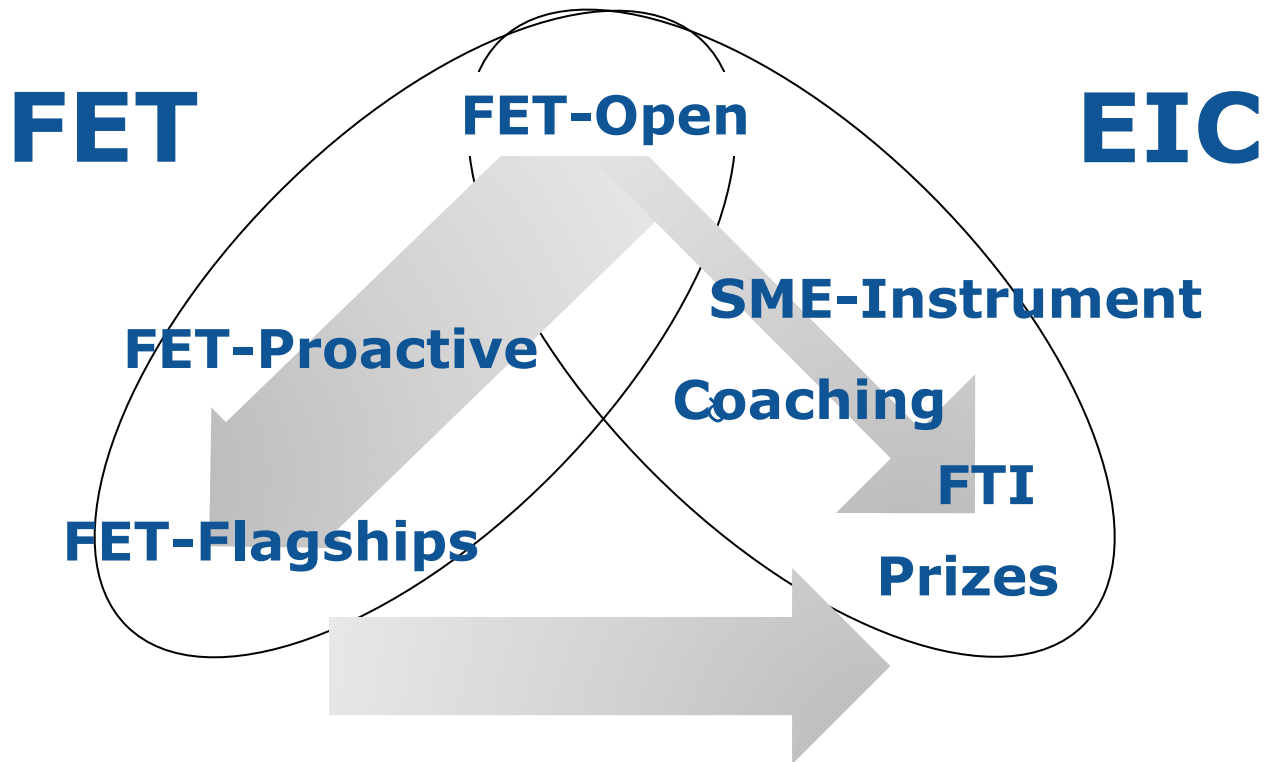
- ***have a clear and radical vision for new technology challenging current paradigms***
 - incremental research following a well-established roadmap will not be funded
- ***target a technological breakthrough***
 - blue-sky exploratory research without a clear technological objective will not be funded
- ***Involve ambitious interdisciplinary research that opens up new areas of investigation.***
 - proposals with only low-risk incremental research will not be funded

FETOPEN-01-	123.70 MEuro	16 May 2018
2018-2019-	160.40 MEuro	24 Jan 2019
2020 (RIA)	160.40 MEuro	18 Sep 2019
	203.00 MEuro	13 May 2020

- Sections 1 to 3 of the part B of the proposal should consist of a maximum of 15 A4 pages.
- A proposal that, according to the evaluator's assessments, does not convincingly satisfy all FET gatekeepers as described under this topic will be declared out of scope.
- The consensus report will comprise a collation of the comments from individual reports, or extracts from them.
- The panel will also decide on any additional comments, possibly including advice not to resubmit the proposal.

- FET-Open is included in the European Innovation Council preparatory phase (WP2018-2020)
- Scope and orientation of FET-Open remain unchanged (interdisciplinary, high-risk, radically new, future technologies, TRL 1-3 for FET-Open)
- The FET-Open call text will be identical in the FET and EIC Work Programmes 2018-2020
- No transfer of budgets between programme parts
- Governance of FET-Open remains fully under DG CNECT and the ERC-FET-MSCA Programme Committee
- SMEs in FET can profit from EIC network, coaching and mentoring

FET and EIC



- a) **FET Communication and Outreach:** communication activities on the FET programme and its achievements, targeting a wide range of audiences going well beyond the world of academia and research. (up to 0.7 M€)
- b) **FET Innovation:** Stimulate the impact on innovation from FET-funded research and improve the innovation readiness levels of FET results. (up to 0.5 M€)
- c) **FET Observatory:** Ongoing and systematic identification of new and emerging technologies from FET portfolio analysis, trends analysis and broader horizon scanning. (up to 0.5 M€)

Call deadline: 11/04/2018

FET Innovation Launchpad (CSA): FETOPEN-03-2018-2019-2020

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- Short (< 18 months) actions focused on the non-scientific aspects and the early stages of turning a result of an ongoing or recently finished project funded through FET under FP7 or Horizon 2020 into a genuine innovation with socio-economic impacts.
- This topic does not fund research or activities that are/were already foreseen in the original FET project.
- Activities can include the definition of a commercialisation process, market and competitiveness analysis, technology assessment, verification of innovation potential, consolidation of intellectual property rights, business case development.

Project size: up to 0.1 M€

Total budget: 8.2 M€

Deadlines: 2018, 2019, 2020

FET Proactive aims to

- Support breakthrough **interdisciplinary** research that develops **new technologies** by building on cutting edge scientific results
- Establish **broad European interdisciplinary communities** of sufficient size to sustain progress in new topics and support the take-up of results
- **Reach out well beyond research communities**, so that Europe can capitalise rapidly and effectively on emerging societal and industrial opportunities

Topic FETPROACT-01-2018

FET Proactive: emerging paradigms and communities (RIA)

- Establish new technological paradigms
- Creating pools of European expertise
- Stimulating the emergence of Innovation eco-systems
- 6 themes selected for 2018
- Targets a mix of small and large projects; up to EUR 7 million
- A second set of topics is to be addressed in 2020

Topic FETPROACT-02-2018

Community building in Neuromorphic Computing Technologies (CSA)

- NMC showcasing, impact awareness, networking across research and industry

Topic FETPROACT-03-2018

FET ERA-NET Cofund (research funding agencies only)

- Follow-up of CHIST-ERA series

FET topic FETPROACT-01-2018: 6 proactive sub-topics

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- a. Artificial organs, tissues, cells and sub-cellular structures
(indicative project size 4-7MEuro, indicative total budget 15MEuro)
- b. Time
(indicative project size 4-5MEuro, indicative total budget 13MEuro)
- c. Living technologies
(indicative project size 4-7MEuro, indicative total budget 20MEuro)
- d. Socially interactive technologies
(indicative project size 4-7MEuro, indicative total budget 15MEuro)
- e. Disruptive micro-energy and storage technologies
(indicative project size 4-7MEuro, indicative total budget 15MEuro)
- f. Topological matter
(indicative project size 4-5MEuro, indicative total budget 10MEuro)

Total: 88 Meuro.

Call deadline: 22/03/2018

- ***Proposals should aim at engineering biological, artificial or hybrid sub-cellular systems (e.g., synapses, organelles, vesicles), highly specific cell assemblies (including microbial), tissues, organs or multi-organ systems.***
 - Exploit recent advances in integrative biology (including modelling and simulation) and bio-engineering
 - Combine the growing understanding of genome, proteome, metabolome and cell behaviour with strategies for the engineering and use of biological and hybrid functional constructs
- ***Possible long-term research targets include:***
 - synthetic cell building
 - organ reproduction, replacement, control or repair
 - high-throughput organ- and body-on-chip technologies for the development of personalised treatment, drugs or vaccines
- ***Ethical issues should be properly addressed***

- ***This proactive is about new technological possibilities inspired by notions of time, not seen as a given and singular background against which things unfold, but rather as a resource that can be experienced and used in different ways.***
- ***Possible research areas proposals could address include:***
 - technologies for subjective time awareness (and its neural basis) and distortion
 - the role of time in processes like aging, healing, learning or evolution and how this can be influenced
 - understanding non-linear temporality in complex systems
- ***New ways to represent, modulate, duplicate or experience and use time could come from technologies in, for instance:***
 - extreme electronics/photonics
 - data-streams analytics
 - time aware artificial intelligence
 - virtual and augmented reality
 - bio-engineering or neuroprosthetics

- ***Proposals should develop new functional biological, technological or hybrid artefacts with features of living systems such as physical autonomy, growth, interaction and enaction, adaptation and evolution. This could involve, for example:***
 - hybrid materials and systems with programmable features of shape, structure, functionality and evolvability
 - possibly starting from naturally existing complexes
 - research on multi-level mathematics and complexity of living systems or the boundaries/characteristics of life could be a part of the work proposed
- ***Proposals could use relevant results from evolutionary biology, ethology, micro-, plant- and animal biology, synthetic biology, systems biology and /or chemical biology***
- ***Ethical issues should be addressed***

FET-Proactive: Socially interactive technologies

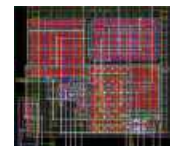
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- *This addresses technologies to support deeper social interaction between people in groups which range in size from pairs to crowds*
- *This new socially interactive media should facilitate building trust and understanding, social integration, engagement, collaboration, learning, creativity, entertainment, education and wellbeing*
- *Proposals should include novel combinations of social sciences and humanities with neuroscience, engineering and computing to develop new experimental tools and paradigms*
 - These tools could take into account, for example, context, culture, emotion, and factors of embodiment and cognition
- *Ethical issues and the gender dimension should be addressed*

- *Proposals should address novel technologies for local (close to where needed) energy generation, capture or storage*
- *This proactive covers:*
 - Technologies for micro-energy or nano-scale energy generation, transfer, dissipation and conversion
 - bio-inspired energy technologies
 - the use of soft or intelligent materials
 - new types of batteries
- *Smart integration of novel energy sources within hybrid/distributed energy systems can be addressed*
- *Sustainability and environmental impact issues should be addressed.*

- ***This topic addresses new materials exploiting interactions between quantum effects and topology***
- ***Topological insulators already studied***
 - possible applications in spintronics
- ***Other material properties can be addressed***
 - applications in photonics, mechanics (eg elasticity, acoustics), superconductivity and plasmas are possible examples
- ***Proposals should go beyond pure physics and mathematics***
 - Prototypes should be built, tested and benchmarked
- ***Methodology should include an engineering approach for using the quantum effects of wave-matter interactions in novel components***

FETPROACT-02-2018: Community building in Neuromorphic Computing Technologies



Type of Action: Coordination and support action

Budget: 500 K€ Call opening/deadline: 31/10/2017 - 22/03/2018

Specific Challenge:

- To network and coordinate the efforts of the European academic and industrial R&I communities in neuromorphic computing (NMC) technologies.
- To showcase a wide variety of NMC technologies
- To stimulate wide industrial interest and further investments in the field
- To accelerate technology transfer, take-up and innovation within an expanding European NMC eco-system

Topics (Type of Action)	Budgets (EUR million)	Deadlines
	2018	
Opening: 31 Oct 2017		
FETPROACT-01-2018 (RIA)	88.00	22 Mar 2018
FETPROACT-02-2018 (CSA)	0.50	
Opening: 05 Jun 2018		
FETPROACT-03-2018 (ERA-NET-Cofund)	6.00	18 Dec 2018

FET Proactive HPC aims to

- *Create a world-class European HPC ecosystem*
- *Develop leading-class technology and solutions towards exascale computing performance for scientific/engineering applications and services*
- *Upraise Europe's scientific capabilities and industrial competitiveness*



Topic FETHPC-01-2018

International Cooperation on HPC

- Aim is to develop strategic partnership in HPC with Brazil and Mexico
- Enable advancing work on HPC applications in domains of common interest
- Brazilian and Mexican partners should participate with their own funding

Mexico: collaboration for state-of-the-art HPC applications in domains of common interest such as energy, life sciences, earth sciences...

Brazil: developing state-of-the-art HPC applications in domains of common interest such as eHealth, drug design, energy, ...

Topic FETHPC-02-2019

Extreme scale computing technologies, methods and algorithms for key applications and support to the HPC ecosystem

A(RIA):

- System software and management
- Programming environments
- I/O and storage environment for data-centric extreme scale computing
- Data-intensive supercomputing and emerging HPC use modes
- Mathematical methods and algorithms

B(CSA):

- Coordinate the European HPC strategy
- Produce roadmaps for HPC technology and applications
- Promote European strategy and results, engage users and promote industry-take up
- Relations with other relevant HPC activities
- Support young talent

Topics (Type of Action)	Budgets (EUR million)	Deadlines
Opening: 1 Feb 2018		
FETHPC-01-2018 (RIA)	4.00	15 Mar 2018
Opening: 7 May 2019		
FETHPC-02-2019 (CSA)	4.00	24 Sep 2019
FETHPC-02-2019 (RIA)	64.00	

ICT Proposer's Day:

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Pre-publication

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Pre-publication at:

<https://ec.europa.eu/programmes/horizon2020/en/what-work-programme>